

**METHOD APPLYING TRANSITIVE CLOSURE TO GROUP BY AND
ORDER BY CLAUSES**

Abstract of the Disclosure

A database engine and optimizer framework support the use of transitive closure to assist in rewriting GROUP BY and ORDER BY clauses to reduce the number of referenced tables (optimally to a single table if possible) and to free the join order
5 selected for the query plan. The SQL parser and optimizer, by performing transitive closure on the selection, or search, conditions is able to identify which fields referenced by the ORDER BY and GROUP BY clauses can be replaced with equivalent fields to improve the performance of the query. In one instance, the fields are replaced so that the ORDER BY or GROUP BY clause references only a single table. If more than one such
10 possible ORDER BY or GROUP BY clause exists, then the optimizer selects from among the different possible clauses to select the one that provides the best performing join order.